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A COMPARATIVE STUDY OF VARIOUS FRUIT AND VEGETABLE COLORS.[1]

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A comparative study of various coloring materials is desirable at the present time on account of the frequency with which questions arise concerning the authenticity of given samples of fruit syrups and fruit juices, and in consequence of legislative attempts which have recently been made to legalize the use of certain harmless colors of vegetable origin where conditions arise in which the original fruit colors are not permanent.

There is no intention whatever to discuss the physiological effect of the vegetable colors as contrasted with the so-called coal-tar or aniline colors (which might be more appropriately referred to as the synthetic colors).

There is no doubt that the synthetic colors as made at the present time are free from the dangerous metallic impurities, such as arsenic, which were formerly associated with these colors on account of the then existing methods of manufacture; and at the present time the feeling against the coal-tar colors seems to be based upon theoretical grounds due to their pronounced tinctorial affinity for animal tissues, rather than upon any observations of the ill effects following the administration of such colors as a class.

Many specific laws have been passed in various European countries regulating the use of coloring matters in foodstuffs, and in some cases attempts have been made to legalize the use of certain colors, which have been proved to be harmless, regardless of their origin.

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The list compiled by the National Confectioners' Association of the United States includes several hundred colors of animal, vegetable, mineral and synthetic origin, and is largely based upon the investigations of Weyl and Koenig and the lists of permitted colors published in Switzerland and in France.

The recent legislative attempts in Pennsylvania to limit the use of added colors to a comparatively small list of well-known vegetable colors seems to call for some special investigation in this direction, particularly as the work which has previously been done in this connection by investigators, such as Robin and Leeds, has not included all of the vegetable and fruit colors which are available and of practical use, while, on the other hand, the tabulated investigations of the coal-tar colors are both numerous and complete, as may be seen by referring to the work of such authorities as Witt, Weingartner and Rota, the scheme of the latter authority being probably the best known and the most widely used at the present time.

The authenticity of the samples which are employed in making the observations in work of this kind is of the highest importance, and in the work upon this subject which is here presented, the identity of every sample which has been used has been assured by personal investigation and by the use of only such canned or preserved fruits or fruit-wines as have been prepared in the author's own family under perfectly normal conditions, using no added material except sugar.

The blackberry color was first obtained by using a specimen of blackberry wine, and was afterward verified from a sample of preserved blackberries.

The black and red cherry colors were both obtained from the canned fruit.

The cranberry color was prepared from the fresh fruit.

The currant color was obtained from the wine, and was afterward verified by using the jelly.

The elderberry color was first obtained from the jelly, and was subsequently verified by using the wine.

The grape color was obtained both from the jelly and the unfermented juice.

The huckleberry color was obtained from the canned fruit.

The plum color was obtained from the preserved fruit.

The raspberry color was obtained from the wine, and was verified by using the preserved fruit.

The strawberry color was obtained from the fresh fruit, and was verified from the preserved fruit.

The beet juice was prepared from the fresh vegetable.

Such dyestuffs and drugs as are commonly used as sources of color, and which were deemed worthy of consideration in this connection, were obtained in the unground or whole condition, through the kindness of Mr. F. P. Sher, of Smith, Kline & French Company, and were prepared for use by the author himself.

In considering the best and most effective method of making a comparison of so many different colors it was deemed advisable to reduce all of the solutions to a uniform color density, rather than to base the comparisons upon the solutions made up to a certain uniform weight in volume strength, owing to the very great differences existing in the tinctorial power of the various fruits and dyestuffs when prepared in the form of aqueous infusions or decoctions, as was done in the present work.

The solutions were prepared as follows: In the cases of fruits where jellies or canned fruits or fruit preserves were used, the pulpy material was separated by straining and the liquid reduced to a given color density by dilution with water and comparison with an arbitrary standard which had previously been prepared for this purpose.

Such drugs as logwood, safflower, saffron, etc., were prepared by making a decoction and digesting it at 100° C. until the coloring matter of the drug appeared to have been thoroughly extracted, then filtering and diluting to the standard color density as before.

A few examples of coal tar or synthetic colors (four in all), taken from samples of materials found to be in actual use by manufacturers in simulating fruit colors, are also included for better comparison.

The liquids having been thus prepared the first comparison was made by observing the color of 5 c.c. of the original liquid, contained in a 5 inch, $\frac{5}{8}$ inch test tube, provided with a foot, and then noting the change which was produced by the addition of 0·5 c.c. of 31·9 per cent. hydrochloric acid to one sample, and 0·5 c.c. of 10 per cent. ammonium hydroxide solution to another sample of the same quantity each contained in a similar test tube.

The tubes were placed side by side upon a sheet of white paper and observations noted of any change in color resulting from the addition of either the acid or the alkali or both.

This series of comparisons resulted as follows:

Fruit Colors.	Original Color.	Hydrochloric Acid.	Ammonia Water.
Blackberry	deep red	bright red	olive green
Cherry (black)	bright red	no change	bright green
Cherry (red)	purple	bright red	bright green
Cranberry	bright red	no change	olive green
Currant	bright red	no change	olive green
Elderberry	purple	bright red	bright green
Grape	purplish red	bright red	bright green
Huckleberry	deep red	no change	deep green
Plum	bright red	no change	bright green
Raspberry	bright red	no change	olive green
Strawberry	bright red	no change	deep red

Other Vegetable Colors.	Original Color.	Hydrochloric Acid.	Ammonia Water.
Annatto	orange red	deep red	no change
Beet Juice	red	no change	olive green
Brazilwood	orange red	slightly lighter	rose purple
*Cochineal	deep red	bright red	purple
Cudbear	deep red	no change	purple
Fustic	yellow	light yellow	dark yellow
Litmus	blue	red	no change
Logwood	purplish red	yellowish red	purple
Madder	red	light red	deep red
Marigold	yellow	no change	slightly darker
Red Saunders	light red	no change	olive green
Safflower	bright yellow	no change	deep yellow
Saffron	bright yellow	no change	no change
Turmeric	canary yellow	no change	reddish brown
Commercial Coal Tar Colors.			
One	bright red	deep red	deep red
Two	deep red	no change	no change
Three	bright red	no change	no change
Four	reddish yellow	no change	deep yellow

*Cochineal is classed with the vegetable colors in these tables.

In observing the changes recorded in the above table it will at once be noticed that with the single exception of strawberry, all of the fruit colors change to either olive green or bright green upon the addition of the ammonium hydroxide solution; and, that with the exception of beet juice and red saunders, none of the other vegetable reds showed this distinctive change, the characteristic change of the other vegetable red colors being mainly to purple or blue upon the addition of the alkali. It will also be seen that in the instances of the synthetic colors, none showed either of these marked changes upon the addition of the alkali, nor have any other coal-tar colors which are in common use been observed by the author in which any marked change occurs upon the addition of ammonium hydroxide solution.

The chief point of difference between the synthetic colors and the natural vegetable colors is found in the fact that the synthetic colors may be deposited upon fat-free woolen goods, by a test known as the dyeing test, without the use of a mordant, while the vegetable colors with one or two marked exceptions will not be so deposited unless a mordant be previously used upon the fabric.

While this distinctive difference is so sharply marked as to make the recognition of the presence of a synthetic color a very easy task, there are certain characteristic effects observable even when the vegetable colors are employed in this test, consequently a comparison in this respect was considered to be of great importance.

The dyeing test was performed by adding 5 c.c. of 10 per cent. hydrochloric acid solution to 100 c.c. of the liquid prepared as in the first comparison, then immersing a piece of fat-free nun's veiling, 1 x 4 inches, and heating at 100° C. for one hour. The wool was then removed and washed thoroughly in plain water and dried.

In cases where an appreciable amount of coloring matter was deposited upon the wool by the first dyeing, a second dyeing test was performed by immersing the piece of dyed wool in a dilute solution of ammonium hydroxide to dissolve the deposited color, removing the piece of wool after the color had been extracted from it, acidulating the liquid slightly with 10 per cent. hydrochloric acid solution, inserting a fresh piece of fat-free wool and again dyeing for one hour at 100° C.

The following table shows the results of this test when applied to the various colors which have been selected for examination and comparison:

RESULTS OF EXPERIMENTS WITH DYEING TEST.

Blackberry.—Dyes wool a dull pink on first dyeing, color changes to green upon applying ammonia. No second dyeing can be obtained.

Cherry (*black*).—Same as blackberry.

Cherry (*red*).—Dyes wool a very light pink on first dyeing, color changes to green upon applying ammonia. No second dyeing can be obtained.

Cranberry.—No appreciable color on first dyeing.

Currant.—Same as cherry (red).

Elderberry.—Same as cherry (red).

Grape.—Same as blackberry.

Huckleberry.—Same as blackberry.

Plum.—Same as cherry (red).

Raspberry.—No appreciable color on first dyeing.

Strawberry.—Dyes wool very faint pink on first dyeing. Ammonia produces no change. No second dyeing can be obtained.

Annatto.—Dyes wool yellow in first dyeing. Ammonia produces no change. Second dyeing very much lighter.

Beet Juice.—No appreciable color on first dyeing.

Brazilwood.—Dyes wool yellow on first dyeing. Ammonia changes to rose purple. Second dyeing very faintly yellow.

Cochineal.—Dyes wool bright red on first dyeing. Ammonia changes to deep purple. Second dyeing very light pink.

Cudbear.—Dyes wool dull red on first dyeing. Ammonia changes to deep purple. Second dyeing slightly lighter than the first.

Fustic.—Dyes wool dirty yellow on first dyeing. Ammonia changes to brown. Second dyeing very light yellow.

Litmus.—Dyes wool light pink on first dyeing. Ammonia changes to bright blue. Second dyeing very faintly pink.

Logwood.—Dyes wool dirty yellow on first dyeing. Ammonia changes to deep purple. Second dyeing very much lighter.

Madder.—Dyes wool orange yellow on first dyeing. Ammonia changes to red. Second dyeing very much lighter.

Marigold.—Dyes wool pale yellow on first dyeing. Ammonia produces no change. Second dyeing little or no color.

Red Saunders.—Dyes wool a dirty pink on first dyeing. Ammonia changes to greenish. Second dyeing little or no color.

Safflower.—Dyes wool bright yellow on first dyeing. Ammonia changes to brown. Second dyeing very much lighter.

Saffron.—Dyes wool bright yellow on first dyeing. Ammonia produces no change. Second dyeing very much lighter.

Turmeric.—Dyes wool bright yellow on first dyeing. Ammonia changes to reddish brown. Second dyeing very much lighter.

Coal Tar Color (*1*).—Dyes wool bright red on first dyeing. Ammonia produces no change. Second dyeing practically the same as the first.

Coal Tar Color (*2*).—Same as (1).

Coal Tar Color (*3*).—Same as (1).

Coal Tar Color (*4*).—Dyes wool orange yellow on first dyeing. No change produced by ammonia. Second dyeing as bright as the first. HCl produces deep red color on dyed wool.

It will be seen upon looking over the foregoing results, that in none of the cases of pure fruit colors could results be obtained by a second dyeing test, and in most cases but a faint pink color, usually a dirty or muddy pink, was obtained in the first dyeing. The application of ammonium hydroxide solution to the wool faintly colored by the pure fruits produced a faint greenish tint in every case but that of strawberry, where no change was observable.

The other vegetable colors were not uniform in this respect. Some of them dyed the wool a pronounced characteristic shade on the first dyeing, but with the exception of cudbear none of them produced any appreciable results upon the second dyeing.

In all of these cases the application of ammonium hydroxide solution to the reddened wool produced a characteristic change to purple, which affords a certain means of distinguishing these colors from the coal-tar colors with which they might be confused.

The yellow colors, such as safflower, saffron, turmeric, etc., exhibited no uniformity whatever. It will be observed that Brazilwood dyes wool a faint yellow shade upon the first dyeing, which might be mistaken for one of the other vegetable yellows, but the application of the ammonium hydroxide solution to the Brazilwood dyed piece of wool produces a characteristic change to rose-purple, while in the other cases there is either no change at all, or, at most, a slight darkening.

The synthetic colors will be observed to have dyed with as much intensity upon the second dyeing as upon the first, and no change

was produced upon the addition of ammonium hydroxide solution to the dyed wool.

These differences, when carefully studied, will be found to afford a means of differentiating many of the vegetable colors and of absolutely proving the presence of synthetic colors.

Fuller's earth, kaolin and kindred earthy materials have been observed to have the property of removing certain colors from their aqueous solutions, and one of the tests for the presence of caramel is based upon this color-absorbing property of fuller's earth.

A sample of kaolin was obtained which gave excellent results when used in the caramel test, and a test was made upon each of the color solutions and the effect noted.

Twenty-five cubic centimeters of the color solution were agitated for five minutes with 10 grammes of the kaolin, the mixture was poured upon a dry plaited filter and the filtrate collected in a dry Nessler's tube. The color of this filtrate was then compared with the color of an equal bulk of the original liquid contained in a similar tube.

These results were as follows:

KAOLIN TEST.

Fruit Colors.	Effect Produced.
Blackberry	slightly lighter
Cherry (black)	" "
Cherry (red)	" "
Cranberry	decolorizes
Currant	"
Elderberry	slightly lighter
Grape	decolorizes
Huckleberry	no change
Plum	decolorizes
Raspberry	slightly lighter
Strawberry	decolorizes

KAOLIN TEST.

Other Vegetable Colors.	Effect Produced.
Annatto	decolorizes
Beet Juice	no change
Brazilwood	slightly lighter
Cochineal	no change
Cudbear	much lighter
Fustic	much lighter
Litmus	decolorizes

Logwood	much lighter
Madder	much lighter
Marigold	slightly lighter
Red Saunders	decolorizes
Safflower	no change
Saffron	slightly lighter
Turmeric	decolorizes

Commercial Coal Tar Colors.

One	no change
Two	no change
Three	no change
Four	no change

While no uniformity can be observed in the decolorizing or modifying effect of the kaolin upon the vegetable colors as a group, it will be seen that an additional factor is afforded for the differentiation and identification of some of the vegetable and fruit colors.

For instance, if beet juice had been added to strawberry syrup the color would not be entirely removed by filtration through kaolin and the addition of ammonium hydroxide solution to this filtrate would produce a greenish color, while, if only the natural color of the strawberry were present, complete decolorization would occur.

The reducing effect of nascent hydrogen produced by the action of hydrochloric acid upon metallic zinc, and of solution of stannous chloride, which plays such an important part in the various schemes for the identification of the synthetic colors, was then tried with the view of ascertaining what, if any, effect such reagents would have upon vegetable colors.

The zinc and hydrochloric acid reaction was produced by adding 1 c.c. of 31·9 per cent. hydrochloric acid to 5 c.c. of the color solution contained in a test tube similar to that previously described, and then adding about 0·5 grammes of metallic granulated zinc and allowing the reaction to continue for at least thirty minutes before making any observations.

The solution of stannous chloride was made by dissolving 5 grammes of pure tin foil in 30 grammes of 31·9 per cent. hydrochloric acid and afterward diluting the solution with water to make 50 grammes. One cubic centimeter of this solution was added to 5 c.c. of the color solution in a test tube similar to the one described previously, and any changes were noted after the mixture had been allowed to stand for five minutes.

The following results were obtained:

Tests with reducing agents. The following fruit colors produce no change in zinc and hydrochloric acid or in a solution stannous chloride: Blackberry, cherry (black), cherry (red), cranberry, currant, elderberry, grape, huckleberry, plum, raspberry, strawberry.

TESTS WITH REDUCING AGENTS.

Other Vegetable Colors.	Zinc and Hydrochloric Acid.	Solution Stannous Chloride.
Annatto	no change	no change
Beet Juice	slightly lighter	no change
Brazilwood	much lighter	no change
Cochineal	no change	no change
Cudbear	decolorizes	decolorizes
Fustic	decolorizes	no change
Litmus	decolorizes	decolorizes
Logwood	slightly lighter	no change
Madder	no change	no change
Marigold	decolorizes	no change
Red Saunders	no change	no change
Safflower	no change	no change
Saffron	decolorizes	no change
Turmeric	decolorizes	no change
Commercial Coal Tar Colors.		
One	decolorizes	decolorizes
Two	decolorizes	decolorizes
Three	decolorizes	decolorizes
Four	decolorizes	decolorizes

In glancing over the preceding table it will be seen that none of the pure fruit colors are affected by either of these reducing agents, while some of the other vegetable colors are either considerably modified or completely destroyed, and in the cases of every one of the synthetic colors examined complete decolorization took place, although it must be said in explanation that there are some non-reducible synthetic colors in use at the present time.

It will also be seen that of all of the vegetable colors only cudbear and litmus are affected by the stannous chloride solution, which adds another factor to the ease of their identification.

In view of the fact that chlorophyll, which is often used as a source of commercial green colors, shows certain easily recognizable characteristics when observed through the spectroscope, this method of examination was applied to every one of the foregoing colors without any distinctive results whatever.

Solution of sodium hypochlorite added to the acidulated color solution produced immediate decolorization in every instance, regardless of the origin of the color.

In summarizing the results of these investigations, which have been conducted during a period of about a year, the author would state that in his opinion, the presence of a coal tar color can be positively detected and that the authenticity of any given sample of fruit juice or fruit syrup may be absolutely proved.

The recognition of many of the other vegetable colors which may be added is facilitated by the application of several of the tests herein recorded and reference to the appropriate table in each case.

Certain well known identity tests for such colors as turmeric and logwood were not included in the foregoing work, as they are well established and need no further investigation.

It has been the intention of the author to contribute these data, most of which are new, with a view of clearing up many of the difficulties which constantly arise, and to aid the solution of the numerous problems which are called upon to be solved in consequence of the enforcement of the laws against food adulteration, and, as the collecting of these data has been of great value to him, he submits them in the hope that others may profit in an equal degree.

DR. CHRISTOPHER WITT.

AN EARLY AMERICAN BOTANIST AND A MAN OF MANY AND VARIED ATTAINMENTS.

By M. I. Wilbert,
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In the year 1614 there was published at Ratisbon, in Germany, a book that purported to contain the true history of the Rosicrucian Society. According to this history, a German, Christian Rosenkreuz by name, had visited the Orient in 1378, and was there initiated into the most profound secrets of occult philosophy and entrusted with the true knowledge of the philosopher's stone and the elixir of life.

On his return to Germany, Rosenkreuz is said to have gathered about him a number of disciples and to have founded the fraternity of the Rosicrucians, or followers of Rosenkreuz. Three of these

disciples were entrusted with the great secrets, and they in turn agreed among themselves that they would not practise any profession in public but that of medicine; that they would not wear a distinctive garb or uniform; that they would meet at least once a year at a regularly appointed spot or place; that they would endeavor to interest such intelligent laymen as would be likely to be interested, and who could subsequently be entrusted with their secrets; and, in conclusion, that they would endeavor to keep the existence of the society secret for one hundred years.

Whether the history, as narrated in this book, was based on fact or whether, as is sometimes asserted, the book itself was written to ridicule the "Societas Physicorum" of the previous century, and the questionable practices and theosophical teachings of the followers of Paracelsus, need not be discussed in this connection; certain it is that, after the publication of this "Fama Fraternitatis," as it was called, the professed adherents of the society became quite numerous, and, in addition to this, a number of more or less allied societies were founded in several of the different countries of Europe. It should be added, however, that many of these co-related societies were not directly connected with what were usually supposed to be the true followers of Rosenkreuz. Thus the "Collegium Rosianum," also frequently referred to as Rosicrucian, which existed during a portion of the seventeenth century, particularly in France, was founded by one Christian Rosé, and was quite distinct, in origin at least, from the Rosicrucians of Germany. This Collegium Rosianum spread rapidly, and soon had branches at The Hague, Amsterdam, Nürnberg, Danzig, and also in England.

Among the earlier Rosicrucians in England was one Robert Flood, born in Kent in 1574. Flood is said to have been a noted physician in London, and to have been an expert student of the occult sciences. Another of the English leaders of this cult was Sir Kenelm Digby, a natural philosopher of some repute, a royalist and at one time chancellor to Queen Henrietta Maria. He was born on June 11th, and died on the same day of the same month in 1665.

During the second half of the seventeenth century, following what was at first a purely religious movement to revive the declining piety among the more educated people of Germany, there originated a number of societies that became known as "Collegia

Pietatis," and subsequently as true Rosicrucians. The originator of this, at its inception purely religious movement, was Philip Jacob Spener, a Lutheran clergyman, born at Rappoltsweiler in Alsace, January 13, 1635, and died in Berlin, February 5, 1705.

Spener himself, it would appear, was as yet not quite free from the religious and speculative mysticism that prevailed in Europe

THESE May Inform all Whom it might Concern That Mr. John Kaighin of Hatfield in the Province of West New Jersey, hath Lived with Me (here under named) a Considerable time, as a Disciple, to Learn the Arts & Mysteries of Chymistry, Physick, & the Astral Sciences, whereby to make a more perfect Discovery of the Hidden causes of More Occult & Uncommon Diseases, not so easily to be discovered by the Vulgar Practice. In all which he has been very Diligent & Studious, as well as in the Administeration of the Medecines, & in the various Cases; Whereon his Judgment may be Safely depended, upon, all things. So far as he follows my Instructions. And Hope he may in all things answer the Confidence that may be reposed in him.

Germantown Febr: 20. 1758. C Witt.

Certificate of Medical Proficiency granted by Dr. Christopher Witt.

during the seventeenth century, for as early as 1680 he formulated the dogma that only persons inspired by the Holy Ghost could understand the Scriptures. It need not surprise us, therefore, that at an early date these Pietists were confounded with the Rosicrucians of an earlier period, and that many of them really simulated the practices of the Rosicrucians to such an extent that it would be difficult indeed to determine, through the atmosphere of secrecy,

theosophy, magic and alchemy with which they were surrounded, whether religious convictions or theosophic vagaries really prevailed.

One chapter at least of this Collegia Pietatis has had a peculiar and permanent influence on the development of the medical and pharmaceutical sciences in these United States, and may, therefore, be discussed at greater length.

About 1690 there was founded in the city of Erfurth, in Thuringia, a chapter of the Collegia Pietatis under the patronage or leadership of the Rev. August Hermann Francke, then the assistant pastor of a Lutheran church at that place. The secret meetings of this organization soon attracted the attention of the government authorities, and, after some investigation, resulted in the promulgation of an edict suppressing the chapter and excommunicating Francke from the State Church. Francke, who was thus compelled to leave Erfurt, subsequently went to Halle, where he founded the now world-renowned orphan asylum, generally known as "Das Hallische Waisenhaus." From a pharmaceutic point of view, the method of securing funds for building and sustaining this institution, is quite interesting. It appears that among the earlier members of the Erfurth chapter of the Collegia Pietatis was an alchemist or chemist, Burgstaller by name, who, at his death, bequeathed to Francke the receipts for compounding certain medicines. These medicines were subsequently made and sold for the benefit of the orphanage in Halle. They were supplied through a regular system of agencies, and sold in every country of the world to which Lutheran missionaries had access. The most popular among these nostrums was the "Gold Tincture," also known as golden drops, "Mutter Tropfen" and "Goldendur" in this country. Large quantities of this gold tincture were sent to this country, particularly to the province of Pennsylvania, and even at the present time an imitation of this nostrum constitutes a popular household remedy in some sections of Pennsylvania. After the edict for the suppression of the chapter of Pietists, at Erfurth, was put in force a number of the members under the leadership of Johann Jacob Zimmermann decided to emigrate to the then newly founded province of Pennsylvania, where, under a more liberal form of government, they might follow their mysterious practices without being molested, and where they might properly prepare themselves for the coming of the millennium, which was thought to be close at hand. Zimmer-

mann, the original leader, died at Rotterdam, in 1693, on the eve of his embarkation for America, and Johannes Kelpius, who had been second in command, was selected to succeed him.

Johannes Kelpius, the son of a Lutheran clergyman, had received a thorough scientific as well as religious training. He was born in 1673, and was therefore only 20 years of age when selected magister. Under the leadership of this young and in many respects inexperienced leader, this chapter of Pietists finally undertook and safely accomplished its journey to the New World.

Here they established themselves on the banks of the beautiful and romantic Wissahickon, just outside of the German town in the vicinity of Philadelphia.

A large number of interesting facts relating to the history of this colony of Pietists in the wilderness have been gathered together by Mr. Julius Sachse, and constitute a large volume entitled "The German Pietists of Pennsylvania."

After they had established themselves in their new home the Pietists were not content to wait listlessly for the end of the world to come, but devoted their time to agriculture and horticulture, the growing of medicinal plants and herbs, the study of astronomy and the practice of alchemy or the black art. In their experiments in the latter, which were conducted only at such times as the stars were favorable, they were assisted by several of the early settlers of the adjoining German town, Philadelphia and Burlington. These early alchemists, who appear to have been quite numerous, would constitute an interesting chapter in the story of the development of chemistry in this country, if the necessarily scattered material could be brought together.

It is quite probable, also, that the first herb garden on this Western Hemisphere was instituted, in connection with this colony of Pietists, in the vicinity of their main building or tabernacle. In 1704 there arrived at this colony on the Wissahickon, a man who was destined to have considerable influence on the development and spread of knowledge in this country, but who, in turn, was not designed to have the recognition that is sometimes accorded to true worth or achievement. This man, a physician, Christopher Witt, or DeWitt, by name, was born in Wiltshire, England, in 1675, and was therefore nearly 30 years of age when he arrived at the tabernacle in the wilderness. Of his earlier life and achievements little or

nothing is known, and the same may be said of his life in the Pietist colony. After the death of the magister, Johannes Kelpius, in 1708, a number of his followers left the colony and established themselves elsewhere. Among these early dissenters were Christopher Witt and his companion, Daniel Geissler, who removed to Germantown, where the former entered on the practice of medicine and the latter attended to the more homely duties about the house and garden. This garden was soon widely known as containing not alone a variety of medicinal herbs and plants, used by the Doctor in the practice of his profession, but also a large and varied collection of indigenous as well as foreign plants and shrubs. The garden itself appears to have been quite extensive, and to have covered considerable ground. Unfortunately, practically all of the information that we have of this garden and its founder is contained in the still existing correspondence between Peter Collinson and John Bartram. From these letters it would appear that for a number of years prior to 1734, the date of the first of these letters, Doctor Witt had been a regular correspondent of Peter Collinson, and had supplied him and others with interesting specimens of American plants and seeds.

Advancing years had evidently made the Doctor somewhat erratic, and it was to secure a more regular supply of novelties, roots and seeds that Collinson began his correspondence with John Bartram, who was then just attracting attention for his knowledge of botany and his faculty for observation. Of the correspondence that passed between Christopher Witt and others, nothing has been preserved so far as known. There can be no doubt, however, that Witt had supplied a number of English botanists with plants and seeds. Peter Collinson himself was closely associated with Dr. Dillenius, the professor of botany at Oxford; Peter Miller, the gardener in charge of the Society of Apothecaries' garden at Chelsea; Dr. John Fothergill, of London, and a number of others more or less interested in flowers and plants.

There can be no doubt, too, that this botanical garden established by Doctor Witt at Germantown, antedates that established by John Bartram at Kingsessing by at least twenty years, and was, if anything, more extensive and more varied.

That Witt was a skilled botanist, and had in addition an intuitive sense of what would appeal to his correspondents in Europe is evident from some of the expressions found in Collinson's letters to

John Bartram, where the latter is not infrequently chided for not sending as interesting or as novel shipments as Dr. Witt. As a direct outcome of this correspondence, John Bartram was induced to cultivate the acquaintance of Dr. Witt, and the two botanists are known to have exchanged visits quite frequently. The account of one of these visits, made by Bartram to Germantown, contains so much to illustrate the varied interests of Doctor Witt than it may well be reproduced verbatim in this connection.

"JUNE 11, 1743.

"FRIEND PETER:—I have lately been to visit our friend Doctor Witt, where I spent four or five hours very agreeably—sometimes in his garden where I viewed every kind of plant that I believe that grew therein, which afforded me a convenient opportunity of asking him whether he ever observed any kind of wild rose that was double. He said he could not remember that ever he did. So, being satisfied with this amusement, we went into his study which was furnished with books containing different kinds of learning—as philosophy, natural magic, divinity, nay, even mystic divinity—all of which were the subject of our discourse within doors, which alternately gave way to botany every time we walked in the garden. I could have wished thee the enjoyment of so much diversion as to have heard our discourse, provided thee had been well swathed from hips to armpits. But it happened a little of our spiritual discourse was interrupted by a material object within doors, for the Doctor had lately purchased of a great traveller in Spain and Italy a sample of what was imposed upon him for snake stones. Besides laughing at him it took me a little time to convince the Doctor that they were nothing but calcined old horse bones.

"Indeed, to give the Doctor his due, he is very pleasant, facetious and plaint, and will exchange as many freedoms as most men of his years, with those he respects. His understanding and judgment thee art not unacquainted with, having had so long and frequent intercourse with him by letters.

"When we are upon the topic of astrology, magic and mystic divinity I am apt to be a little troublesome, by inquiring into the foundation and reasonableness of these notions which thee knows will not bear to be searched and examined into; though I handle these fancies with more tenderness with him than I should with

many others that are so superstitiously inclined, because I respect the man. He hath a considerable share of good in him.

"The Doctor's famous Lychnis, which thee has dignified so highly, is, I think, unworthy of that character. Our swamps and low grounds are full of them. I had so contemptible an opinion of it, as not to think it worth sending, nor afford it room in my garden; but I suppose by thy account, your climate agreeth so well that it is much improved. The other, which I brought from Virginia, grows with me about 5 feet high, bearing large spikes of different coloured flowers, for three or four months in the year, exceeding beautiful. I have another wild one, finely speckled and striped with red upon a white ground, and a red eye in the middle, the only one I ever saw.

"Our worthy friend Colden wrote me he had received a new edition of 'Linnæus's Characteres Plantarum,' lately printed. He advised me to desire Gronovius to send it to me. I should be very glad to see it. The first I saw was at the Doctor's (Witt), and chiefly by it he hath attained to the greatest knowledge in botany of any I have discoursed with.

"JOHN BARTRAM."

The reference in this letter to the common occurrence of a certain plant probably illustrates better than anything else the difference in the methods followed by Witt and by Bartram. The latter frequently made long trips to gather seeds of plants that were to him uncommon, while the former sent such seeds and plants as he thought would be interesting to his correspondents. The reference is in answer to a paragraph contained in a letter from Peter Collinson, dated June 16, 1742, in which he says: "I have a Lychnis from Doctor Witt different from any yet that I have seen. It seems to be king of that tribe. Its stalk is near as thick as my little finger (which is but small for a man). It is now about 2 feet high, and yet no flowers appear. The stalk is most finely spotted, which is very distinguishing from all the rest that I have ever seen."

Dr. Witt evidently had a good classical education as well as a thorough training in the medical sciences of that time. He is said to have had a number of students in languages, the classics and also in medicine. In Dr. Packard's "History of Medicine in the United States" will be found a reproduction of a certificate of medical proficiency granted by Dr. Christopher Witt to one John Kaighin, of

Hathfield, in the Province of West New Jersey, which bears witness to the fact that this particular student or disciple having had instruction "in the arts of chemistry, physics, and the astral sciences whereby to make a more perfect discovery of the hidden causes of more occult and uncommon diseases, not so easily to be discovered by the vulgar practice," is deserving of the confidence that may be reposed in him.

Of his student, Jacob Philadelphia, Mr. Sachse has given an interesting account in a paper read before the American Jewish Historical Society in 1897.

Among other friends or students, Christopher Sauer, the Germantown printer, and his son Christopher, are said to have spent some time with Dr. Witt on their return to Germantown from the Conestoga. Dr. Witt also had quite a reputation as an astronomer and a mathematician. His description of the comet of 1743 is said to be the most complete of any known description of that phenomenon. The Doctor was, in addition, also an expert mechanic, as well as something of an architect; he is said to have built the first three-story house in Germantown, and to have built it so well that it stood for more than a hundred years after the death of its builder. He is also known to have been an expert clockmaker and is said to have built the first tower clock ever made in the province. One of his own clocks, retained by himself, is said to have struck the hours and quarter hours—quite a feat for that time. He also built for himself a pipe organ and is said to have been quite proficient as a musician. That he was also somewhat of an artist is evidenced by the portrait of Johannes Kelpius, the Magister of the Pietists on the Wissahickon, which is now in the archives of the Pennsylvania Historical Society.

In his own day this diversity of occupation was not, however, compatible with a desirable local reputation. It was chiefly, no doubt, largely due to this diversity of attainments that he was generally considered, by the more simple and superstitious inhabitants of Germantown, as being in league with the evil one, and was popularly known as the Hexenmeister, or master of the witches.

This popular opinion of the true source of Dr. Witts' abilities was still further confirmed when the latter returned from one of his periodical visits to Philadelphia with a negro slave. With the passing years his old friend and associate, Daniel Geissler, had become unable to attend to the many and varied duties about the house and

garden, the older members of the Warmer family, with whom they had been on intimate terms, had died and the two old men probably thought that some younger, reliable help was needed or desirable. The introduction of a mulatto servant into a superstitious German community, in connection with the well-known practices and attainments of the Doctor, naturally suggested the idea, then, that the Hexenmeister had made a new compact with the evil one and that the latter had allowed one of his assistants to come to earth and attend the now ageing man. At all events, the Doctor and his famulus were generally referred to as the "Hexenmeister and his Teufelsbursche."

It should be remembered, however, that the Germantown of the eighteenth century also contained men of more than average learning and ability. Among these Francis Daniel Pastorious, a friend and student of Philip Jacob Spener, the originator of the "Collegia Pietatis," settled in Germantown in 1683, and was, no doubt, the direct cause of attracting Kelpius and his follower to the Province of Pennsylvania. The life and achievements of this early scholar have been immortalized by Whittier in the "The Pennsylvania Pilgrim." Pastorius, it is said, was also interested in botany, and furnished plants and seeds to correspondents in Europe, particularly in Germany. The gardens belonging to Pastorius and Dr. Witt adjoined, and as they were also friends in addition to being neighbors, there is considerable probability that they vied with each other in obtaining the most numerous and the most varied collection of plants.

Another of the well educated inhabitants of Germantown, and also a close friend of Dr. Witt, was Christian Lehman, a man of varied accomplishments, who is said to have been conversant with the Latin, Greek, Hebrew, German and English languages, and to have cultivated the higher mathematics, astronomy and chemistry with great success. Christian Lehman came to America with his father in 1731. He, too, appears to have been interested in botany, and it is said that he was the first to introduce English walnut trees into this country. An advertisement in the *Pennsylvania Gazette* for August 4, 1763, announces that Christian Lehman, in Germantown, has for sale "An assortment of English double hyacinth roots of a variety of colors, as well as sundry other sorts of flower roots of various prices. He also keeps constantly for sale some of the best English walnut trees, as well as other fruit and flowering trees of a size fit to plant out."

Watson, in his "Annals of Philadelphia," says that Christian Lehman, a notary public, surveyor and gentleman, was also able to cast nativities. He had been a student of Dr. Christopher Witt, and was as expert as his master. He cast them for all of his nine children, but never for hire.

One of these nine children, a son, William Lehman, engaged in business as an apothecary on South Second Street, in Philadelphia, where he was succeeded by his son, William, who was prominently identified with the organization of the Philadelphia College of Pharmacy, was its second president, and responsible for its present title. Peter Lehman, who is usually spoken of as the originator of the Philadelphia College of Pharmacy, was a cousin of William Lehman, and served his apprenticeship in the same store. This particular connection, of course, suggests the question as to how much of their early training these and others of the early members of this college owe, indirectly, of course, to Dr. Witt and his associates.

Daniel Geissler, the early companion of Dr. Witt, died in 1745, and was buried in a plot of ground set apart by Dr. Witt and the Warmer family as a burial plot. The now aged and lonely Doctor continued to live alone in the large stone house, attended only by his mulatto servant.

In 1759 Dr. Witt, now in his 85th year, was stricken with an affection of his eyes and gradually became blind. Despite this affliction he still appears to have been a very active man, and on several occasions undertook long trips to gather seeds and plants or to visit his friends. In 1761, when 86 years of age, he visited John Bartram at his house in Kingsessing, although, as the latter says in a letter to Peter Collinson, "He was so blind that he could not distinguish a leaf from a flower."

When we consider the distance from Germantown to Kingsessing, the necessarily poor roads and the primitive methods of conveyance, this was indeed quite a feat for a man of his years and affliction to accomplish.

Peter Collinson, writing in 1759, says: "I am concerned to hear poor Dr. Witt, my old friend, is blind. A well-spent life, I doubt not, will give him consolation and illuminate his darkness."

Of the remaining years of Dr. Witt but little is known. It is probable, however, that he lived contented and well looked after by his negro slave and the descendants of his old friend Warmer. Dr.

Witt died in January, 1765. The *Pennsylvania Gazette* for February 7, 1765, contains the following obituary notice of him: "Last week died at Germantown, Dr. Christopher DeWitt, a gentleman long and well known throughout this and the neighboring provinces for his great services and abilities in his profession of a physician."

Dr. Witt was buried in the little graveyard with his friends, Warmer, Geissler and a number of others, who had been interested in the Pietist colony on the Wissahickon. This little graveyard was at that time generally referred to as Spook Hill. This name had been given it by the superstitious inhabitants of Germantown from the fact that Daniel Geissler and several of the other original members of the theosophical society had been buried there with the peculiar rites of the Rosicrucian Brotherhood, performed over them by Dr. Witt. After the burial of Dr. Witt the place was more than ever shunned, particularly after nightfall.

For many years it was asserted by those who claimed to know that the spirits of the bodies buried in this plot were not at rest, and that they frequently visited the plot at night. It was also asserted that for weeks after the burial of Dr. Witt blue flames were seen to hover over his grave at night. How long these uncanny things appeared no one is willing to assert; they have long since passed into tradition, for a Christian church now occupies the plot, and covers all that was mortal of Dr. Witt, his friend Geissler and his mulatto servant, Robert Claymore. The last will and testament of Dr. Witt should be mentioned, however, as it illustrates as well as anything can his kindly feelings and his true Christian charity. To his servant, Robert Claymore, in addition to securing him his liberty, he bequeathed a plot of ground, the house on it and all the furnishings it contained; also all of the tools, instruments and utensils appertaining to the making of clocks. Also the "great clock which strikes the quarters." To the Pennsylvania Hospital, then a comparatively young and poor institution, he bequeathed the sum of £60 in cash. After making several additional minor bequests, he gave his residuary estate to the descendants of his friend Warmer, who had befriended him on his arrival in the German town.

So lived and died Christopher Witt, physician, naturalist, astronomer, mechanician, artist, musician, alchemist, theosophist and mystic. He was indeed an interesting and strange combination of

scientist and charlatan, religious ascetic and successful business man, scholar and dreamer. Partially forgotten and lost as he is through want of authentic information, and surrounded by a halo of strange tales and traditions, he constitutes a peculiarly attractive link between the scientific theories and practices of to-day and the romantic dreams and mysterious doings of the long ago.

THE TRAINING OF BRITISH PHARMACISTS.

By F. A. Upsher Smith, Pharmaceutical Chemist.

Prof. Carl G. Hinrichs recently referred[1] to the training of pharmacists in Great Britain in a paper which suggests further notes on the same subject, and incidentally a few corrections. Professor Hinrichs states that "any one may be examined for a degree before their universities, whether he studied in England or not." But in England, as regards university examinations, this applies only to the London University; at Oxford, Cambridge and the other universities residence for a certain number of terms is necessary. The examinations of the Pharmaceutical Society, however, may be taken by a student without having studied at any school or college. In England a few students do not give up business for a time to attend school or college, but devote certain evenings during the winter to attendance at local classes in botany, physics and chemistry, and in this way prepare themselves cheaply and slowly for the qualifying examination, the Minor. This, however, is an arduous method of preparing for the examination, and nowadays few adopt it. The majority of students enter a school or college for a six or nine months' course, at the end of which they sit for the Minor. The School of Pharmacy of the Pharmaceutical Society of Great Britain, familiarly known as "The Square," is the leading school, and in a few provincial university colleges a special course is arranged for pharmaceutical students. In these institutions the course for the Minor extends over a whole session, about nine months. In addition there are a number of private schools where the Minor course is completed in three or six months, and where the tuition follows more closely the exact lines of the syllabus. It should be noted that the great majority of candidates for the Minor are trained in

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[1] *Ante*, page 75.

these private schools, chiefly on account of the shorter time taken to get through the course. Another point of importance in studying the training of the British pharmacist is the fact that the majority of students are, unfortunately, content with the Minor, which is the legal qualification to open a shop for the sale of poisons, and confers the title of "Chemist and Druggist."

Another point raised by Prof. Hinrichs is the preliminary training of apprentices. It is *not* obligatory for a youth to pass an examination in the liberal arts prior to his entering a pharmacy as an apprentice, but such an examination must be passed before entering for the Minor. Probably the majority of youths do pass a recognized examination in these subjects before leaving school, and it is much the best for them to do so, as they are then better able to devote themselves to a study of their new avocation. Apprenticeships in Great Britain were of seven years' duration in the early part of the last century, but a period of three or four years is the usual time at the present day. It is interesting to note that apprentices are now very scarce in pharmacy. A few years ago premiums of 100 guineas or pounds were often obtained with an apprentice, and other varying sums down to £50 were quite the rule. In addition, the parents or guardians had to find clothing, books, pocket-money and other personal expenses, as the English pharmaceutical apprentice, as a rule, receives from his master only board, lodging and medical attendance when required. There are many pharmacies in England to-day where apprentices would be taken eagerly without premium, so scarce are they. In Scotland the conditions of apprenticeship are rather different. Many apprentices there live at home and may receive some remuneration during their pupilage. Many reasons are advanced to account for the dearth of apprentices in England, of which the most likely is that a lad who is sufficiently well educated at school to pass a preliminary examination which would be accepted by the Pharmaceutical Society would also be eligible to enter the more professional callings, *e. g.*, medicine or the law. When the whole cost of training in pharmacy is added to the cost of a business the total would usually exceed the cost of entering a profession. It is well known that in Great Britain the earning power of a retail pharmacist is small, and the well-paid posts in pharmacy are few in number, comparing unfavorably with the professions named. But whatever the reason, the fact remains that apprentices

to-day are scarce; consequently assistants are becoming scarce, and if there is no adjustment of the balance the result will be to the ultimate advantage of those who do enter the calling.

In comparing the relative ages of American and English students in schools of pharmacy, Professor Hinrichs comments on the more mature appearance of the latter; this difference is easily explained. Candidates for the Minor must be twenty-one years of age, and, as the course of instruction at a school does not extend over more than nine months, it follows that prospective candidates remain in business until about the age of twenty. The usual age for leaving school is sixteen, and if the apprenticeship is over before the age of twenty is reached, a post is readily obtained in the interval as an unqualified assistant in a pharmacy. The "Minor" examination itself is usually regarded with awe by candidates. This is owing to the fact that the examination is partly practical and partly oral. Hence a nervous candidate is placed at a disadvantage throughout the whole examination. There is no valid reason why written papers should not be set in theoretical chemistry, physics, botany, pharmacy, prescription-reading and materia medica, supplemented by a certain amount of *viva voce* examination in some or all of these subjects. But at present there is no written paper and the nervous man suffers accordingly. Many absurd instances are quoted of nervousness in this examination. One candidate, during an examination in practical pharmacy, was told to help himself to an apparatus for coating pills in the far corner of the dispensing-room. He returned after a time with a lemon-squeezer! I have known students, the best of their year, misname such familiar drugs as gentian root and senna leaves. Alterations in the Major Examination which confers the title of "Pharmaceutical Chemist" are at present under the consideration of the Council of the Pharmaceutical Society. It has been recently proposed[1] by the Board of Examiners, that in future the subjects of the Major Examination shall be: (*a*) chemistry and physics; (*b*) materia medica and pharmaceutics; (*c*) botany. Of these subjects it is proposed that (*b*) should be obligatory on all candidates, together with either (*a*) or (*c*). The advantages claimed for this suggested reform are: (1) That a larger number of candidates may be expected to present themselves for the Major Examination.

[1] *Pharmaceutical Journal*, May 6, 1905.

(2) Encouragement will be given to candidates to specialize on the physical or biological side. (3) The increased importance given to materia medica and pharmaceutics by the extension of the time devoted to them in the examination will encourage the teaching of these subjects, and induce more students to become expert in what should be regarded as the most important branches of the art of pharmacy. (4) The inclusion of pharmaceutics with materia medica on a suitable syllabus will insure that a candidate who takes the biological side will be sufficiently examined in applied chemistry to avoid any diminution of the real value of the title of "Pharmaceutical Chemist." One member of the Board, Professor Trail, suggested that in the case of candidates taking the biological side, zoology might with advantage be added to the subjects for the Major Examination. The Boards, while regarding the suggestion as worthy of consideration, do not at present press the point. The scheme has only just been published, and so far there has been no time for correspondence in the pharmaceutical journals. It would seem to be a wise departure. There are many pharmacists who would find it useful to have a wider knowledge of chemistry than is obtainable in the present Major course of instruction, owing to the time devoted to botany. And, *vice versa*, those who wish to devote themselves more to biological studies would, under this scheme, be allowed to drop part of the course in chemistry. The need is great for attracting more candidates to the Major examination. For pharmacists to hold their own with the medical men with whom they come in daily contact it is very desirable that their training in pharmacy should be as thorough as possible. It is to be hoped that a trial may be given to this scheme of specialization.

PRACTICAL NOTES ON PHARMACEUTICAL SUBJECTS.

By Thos. S. Wiegand.

It may seem strange to come before the pharmaceutical meeting with the simple subjects which my paper treats of; but recent conversation with some who have had good opportunities to learn convinces me that it is well to reinforce the lessons they have received from far more able teachers.

First the subject of percentage solutions, which seems so plain to most pharmacists, is still a stumbling-block to some who should

know what they are and how to prepare them. A description of such simple apparatus as is needed will perhaps be the best and easiest way to make the subject plain to those who fail at first to understand the matter.

Thus a 1-per cent. solution of cocaine hydrochlorate is readily made by mixing 10 grains of the salt with a small quantity of distilled water and pouring it into a vial previously counterpoised on a scale, and then adding distilled water until it balances 1,000-grain weight. To save trouble in making subsequent lots, a mark may be made on the vessel, and the salt weighed mixed as before with a small quantity of distilled water, and the required quantity of distilled water added to make the measure of 1,000 grains.

It has been found very convenient and a great saving of time to keep a solution of strychnine sulphate, which is often prescribed, in mixtures of such strength that 2 fluid drachms will contain 1 grain of the salt, so that by using 1 fluid drachm of the solution when ½ grain of the salt is prescribed much time is saved and the thorough mixture of the salt is secured.

A mixture of arsenious acid and sugar of milk is also found to be useful, 1 grain of the acid being triturated with 15 grains of dry granulated sugar of milk until an impalpable powder is obtained; if ½ grain of the acid is prescribed, 8 grains of the mixture will be required.

Triturates of arsenious acid, strychnia, corrosive sublimate, calomel, morphine and several other active remedies are found very useful, and render dispensing them safer and much easier.

Phosphorus is sometimes prescribed in pilular form, and many dispensers have found it quite troublesome to make such pills and to be certain that the exact quantity is in every pill. A method that has proven satisfactory is to weigh a given quantity of the phosphorus, place it in a test-tube and add sufficient pure carbon bisulphide to dissolve it; then butter of cocoa is added in small portions until fifteen times its weight has been added. The test-tube should be first fitted with a cork and the mixture shaken after each addition of the cocoa butter, and when all has been added the test-tube should be placed in warm water and shaken until thoroughly mixed. Of course, each 16 grains of this mixture will contain 1 grain of phosphorus, and in this way the phosphorus can be easily made into pills with the other articles directed in the prescription.

While manipulating it, a few drops of chloroform may be put into the mortar to exclude air and prevent any likelihood of oxidation; the pills when finished may be coated with a little mucilage of gum arabic, or ethereal extract of tolu, and rolled in finely powdered sugar.

Pills containing essential oils are often a trouble to the dispenser, particularly if more than a drop is directed in each pill; this is especially the case when resinous substances are directed with it. This trouble is readily obviated by a small quantity of powdered castile soap.

Camphor also is troublesome to make into pills, as they have so little coherence. This annoyance is easily obviated by adding a small quantity of powdered resin to the camphor; a quite coherent mass is thus obtained. It is not desirable to use it if the pills are to be long kept, as they will become quite soft.

Nitrate of silver is frequently prescribed in pilular form, and the great tendency of this salt to be decomposed in the presence of organic matter renders it proper to seek a substance free from this objection. It is best found in pure kaolin, or precipitated silica, the salt being first reduced to powder, and a sufficiency of the clay or silica made ductile by a very small quantity of glycerite of tragacanth (2 parts of the gum to 100 parts of glycerin); the mass then well mixed and divided, observing to refrain from the use of steel spatulas in dividing it.

Permanganate of potassium is also troublesome material to form into pills, as it is so powerful an oxidizing agent. In this case the salt is to be powdered, and then incorporated with butter of cocoa, which, having no solvent power over it, makes a satisfactory vehicle; if the weather be very warm, a little white wax may be melted with the butter of cocoa before making the mass.

ON THE SERUM TREATMENT OF HAY FEVER.[1]

By Dr. A. Luebbert.

A number of investigations on the etiology and specific therapy of hay fever, which have been conducted in this institute, have been

[1] Abstract of a paper prepared at the suggestion of Prof. Oscar Liebreich, by Dr. Luebbert, of the State Hygienic Institute of Hamburg, of which Prof. Dunbar is director, and published in the *Therapeutische Monatshefte* for December, 1904.

reported by Dunbar and his students. To these should be added the experiences acquired last summer. The object of this paper, written at the request of Professor Liebreich, is to discuss briefly the question of the serum treatment of hay fever.

The conception that hay fever is caused in persons disposed to it by pollen is found in the older literature on the subject, especially in the English. The proof, however, has been brought by Dunbar's exact experiments for the pollen of a considerable number of plants. These experiments have been verified by numerous investigators, both in the Old and the New World. The following is a list of plants the pollen of which are the cause of hay fever: Syringa vulgaris, Secale cereale, Avena sativa, Hordeum sativum, Avena flavescens, Oryza sativa, Calamagrostis lanceolota, Calamagrostis montana, Calamagrostis Halleriana, Dactylis glomerata, Poa pratensis, Anthoxanthum odoratum, Eriophorum vaginatum, Cynosurus cristatus, Phalaris arundinacea, Lolium perenne, Holcus lanatus Alopecurus pratensis, Aira caespitosa, Brachypodium silvaticum, Agropyrum repens, Festuca elatior, Festuca gigantea, Triticum sativum, Bromus mollis, Lonicera caprifolium, Convallaria majalis, Polygonatum multiflorum, Oenothera biennis, Brassica Napus, Carduus acanthoides, Leucanthemum vulgare, Solidago odora, Solidago nemoralis, Solidago canadensis, Centaurea Cyanus, Chrysanthemum, Aster, Zea Mays, Carex vulgaris, Carex intermedia, Carex arenaria, Carex paniculata, Carex glauca, Carex alba, Carex verna, Atriplex hortense, Ambrosia trifida, Ambrosia artemisiaefolia, Ambrosia elatior, Ambrosia maritima, Xanthium macrocarpum, Iva xanthifolia, Spinacia oleracea.

In connection with this list, and to the completion of which work is unceasingly continued, it may be observed that the hay fever of Europe and the June cold of North America is principally produced by the pollen of grasses, the widely spread and dreaded Autumnal cold of North America is caused by the pollen of ragweed (Ambrosia) and of goldenrod (Solidago), also of asters and chrysanthemums. Right here it may be stated that in this paper we shall not be able to go into further details concerning the autumnal cold of America.

From the pure active pollens a protein-like substance has been isolated according to Dunbar's directions by precipitation with salt and alcohol. This substance is highly toxic when applied to patients

susceptible to hay fever, but indifferent in its action to persons not predisposed to the same. This poison has been examined chemically by Kammann, who arrived at the following conclusions:

(1) The hay fever poison belongs to the toxalbumins.

(2) It is thermostable.

(3) The toxin is stable toward acids, but very sensitive toward alkalis.

(4) Enzymes, such as pepsin and trypsin, do not destroy it entirely.

(5) By the complete saturation of its solutions with ammonium sulphate it is precipitated.

According to more recent investigations of Kammann, soon to be published, the antitoxin is (combined) quantitatively bound with the serum globines.

The symptoms produced by the toxin in hay-fever patients will vary according to the place of application. With conjunctival application of the poison, there have been observed itching, lachrymation, photophobia, injection into limbus and conjunctiva even to chemosis. Applied to the nose it caused sneezing, profuse secretion, reddening and swelling of the mucous membrane to the extent of rendering discharge impossible. Aspiration of the toxine, when brought about accidentally while weighing the substance, produced a desire to cough with a difficulty to breathe out, and stridor. When rubbed into the skin intense itching resulted, accompanied by local erythema and rash. Injected subcutaneously, all of the above-mentioned symptoms were produced; sternutation, nasal hypersecretion, asthma, urticaria over the entire body, accompanied by a temporary light to medium disturbance of heart activity, namely, palpitation of the heart, a rapid and very feeble pulse, dyspnea and marked cyanosis. The poison, therefore, appears to excite primarily the vasodilatory and secretory nerve fibres. These phenomena caused Alberts to regard hay fever merely as a sympathetic neurosis.

Sensitiveness to the poison varies with different individuals within wide limits.

Among those who were the subjects of this investigation the most sensitive ones showed a decided condition of local irritation, both objectively and subjectively, after the instillation of $\frac{1}{400}$ milligram of the proteid of rye pollen into the conjunctival sac. In the

most of the cases which were under observation the average effective dose was from $\frac{1}{1000}$ to $\frac{1}{2000}$ of a milligram.

Sensitiveness to the toxin, as proven by our tests, is almost uniformly constant for the same individual.

Two cases may be cited which bear upon this point, one of them has received more than a thousand applications of the toxin to his eyes and his nasal mucous membrane during the last fifteen months, and the other several hundred during the same period.

The reaction in these two cases is as prompt and almost as intense as it was at first, the dosage remaining constantly the same. This point is emphasized in order to show that there is no noteworthy active immunity to the toxin, notwithstanding the fact that this might have been anticipated in accordance with Romer's experiments in producing immunity in rabbits by the instillation of Abrin into the conjunctival sac. These investigations have shown that the victims of hay fever have a particular sensitiveness to the pollen of certain plants, and especially to that of the graminaceae. The determination of the etiology of this disease may, therefore, be regarded as accomplished, particularly since Liefman has demonstrated, in addition to the facts previously established, that the appearance of the pollen of the graminaceae is parallel with that of the appearance and severity of the hay fever. In the meantime the extensive investigations relating to the preparation of an antitoxin, which had been undertaken as soon as the origin of the disease had been definitely determined, had reached a preliminary conclusion.

By the inoculation of rabbits, goats and horses, serum was obtained which neutralized the pollen toxin in vitro, and, in practice, protected those who were susceptible to hay fever from its attacks.

The manufacture of the serum, which was undertaken by Schimmel & Co., of Militz, in the Spring of 1904, consists in injecting the poison subcutaneously in gradually increased doses into horses which had proven sensitive to a preliminary inoculation. As a rule the formation of the antitoxin begins after two or three months of treatment and increases from week to week. At first the increase is rapid; it then gradually becomes less rapid, until finally the maximum appears to have been reached. With regularly withdrawn samples of blood a systematic titration of the antitoxin upon the hay-fever patient is accomplished in the following manner:

First.—The weakest concentration, for example of a solution of

the rye pollen protein is determined, of which one drop instilled into the conjunctival sac will just cause, within a few minutes, a subjective and objective reaction. This may be termed the maximum dosage. Then a series of toxin and antitoxin mixtures is so arranged that equal volumes of diluted serum are added to definite quantities of a doubly concentrated solution of toxine. The mixture, which just evades irritating the patient's eyes, is designated the neutral mixture.

The effectiveness of the serum is therefore determined by the degree of dilution which is required to neutralize the plain toxin solution.

This determination following the very numerous tests, is not affected by errors exceeding 10 per cent.

Now, from the horse, which has proven its high value, a suitable quantity of blood is withdrawn—at least ten days after the last inoculation—and worked for its serum properties.

The horses which are used for this purpose, being under the constant care of a veterinary surgeon, all manipulations are made under the strictest aseptic precautions. The antitoxin contained in the serum is under constant surveillance, and hence it is possible to obtain an absolute harmless preparation and one constant in its effectiveness. Now with regard to the method of using the serum, it was emphasized from the beginning that this medium was not intended for subcutaneous use, but only for external application at the site of the disease. Neither has the time yet arrived when the subcutaneous method of treatment can be recommended; for even though favorable results have been obtained in very bad cases, such results persist not more than two or three days at the most and even then but a partial immunity is obtained. Besides, the disagreeable feature of subcutaneous injection would, for most people, outweigh their advantages. On the other hand, the local treatment, which consists in the direct application of the serum to the afflicted mucous membrane of the eyes, nose, or pharynx, has proven efficacious.

The serum is used either in the fluid form or in the form of a powder which has been dried in a vacuum.

If the fluid form is used, the addition of a suitable preservative must not be omitted. Carbolic acid may be added for this purpose in the proportion of 1 to 400.

In a comparative test of various suitable mediums for preserving the serum and which would not be irritating to the mucous mem-

brane, carbolic acid was found to be the most desirable. It had the advantage of producing the most efficient antiseptic as well as the additional one of a passing slight anæsthetic action. In spite of this addition, however, a bottle of the serum which is carried about in the warm coat or waistcoat pocket, and is frequently opened for use, remains no longer sterile. There are certain varieties of bacteria found in the air and in the mucus from the nasal mucous membrane which can thrive even in serum containing carbolic acid the proportion of 1 to 400. The presence of such a growth of bacteria signifies the decomposition of the serum and is announced by the uniform cloudiness of the fluid and occasionally by an offensive odor. In order to check the decomposition of serum in a bottle which has once been opened, it is recommended that small quantities of the fluid be poured from the serum container into the small bottle, attached to which is a pipette, and that such and the pipette be sterilized as frequently as possible. The method of using the serum is as follows:

(1) Pour about a third of the contents of the serum-phial into the accompanying empty glass-phial, provided with a dropping pipette. The phial with dropper is sent out in a small wooden case, and should be carried in the pocket as nearly as possible in the upright position.

(2) The method to employ in using liquid pollantin is as follows:

(*a*) For the eye.—Bring, by means of the pipette, one drop to the outer angle of the eye, and drawing down the lower lid with the finger, allow the drop to come into contact with the mucous membrane. A pleasantly cool sensation felt in the eye shows that the instillation has been properly carried out.

(*b*) For the nose.—With the head bent somewhat backwards, insert the point of the pipette about half an inch into each nostril and express one or two drops of pollantin into each. Care must be taken to keep the pipette squeezed so long as it is within the nose, otherwise the pollantin will be drawn back into the pipette again. After pollantin has been introduced into one nostril, the other must be kept closed while the serum is snuffed up from the one treated, tapping the while on the outside of that nostril with the finger.

(3) The pipette, together with its india-rubber head, should be thoroughly cleaned at least once daily, and kept for one minute in boiling water.

(4) Hay-fever patients ought to sleep with closed windows during the hay-fever season.

(5) Pollantin should be used, both for eyes and nose, regularly every morning a few minutes before rising. Should it cause sneezing or reddening of the mucous membrane of the eye, the preparation should be again used after the lapse of one or two minutes, and if the sneezing or the reddening of the eye does not then disappear, the instillation should be repeated a third or even a fourth time.

By this morning treatment the patient will generally find himself insensitive to the hay-fever poison for several hours, often indeed for the whole day.

(6) Those patients who are unable to keep themselves completely free from attacks—even when they begin serum treatment before the commencement of the hay-fever season, always sleep with windows closed, and regularly carry out the above-described morning treatment—are recommended to carry pollantin always about with them. They should use the serum during the course of the day whenever there is the slightest sign of irritation, and not wait until a sharp nasal attack sets in, when the nose becomes so swollen and blocked that pollantin cannot be efficiently applied nor properly absorbed from the altered mucous membrane.

(7) If the use of pollantin at the correct time, as described, has been neglected, the serum may sometimes still be used with benefit in the early stages of an attack, stopping the burning in the eyes, the excessive flow of tears and the sneezing. Should, however, the hay-fever poison have entered the body in such amount that the eyes have become strongly inflamed and the nose swollen and blocked with secretion, or that asthma has appeared, then the patient should retire to rooms with doors and windows closed and remain there until all these symptoms have disappeared. By using instillations of pollantin, at first every ten minutes and later at longer intervals, this process can be accelerated. When the patient's condition is once more restored to the normal, he should endeavor to prevent any further attacks by the careful use of the serum as above described.

Although for certain purposes the fluid pollantin cannot be well dispensed with, it yet suffers from many disadvantages, notably: inconvenience in handling, limited stability and the at times, to the very sensitive patient, so distressing carbol feature.

Compared to same the powdered form represents a decided progress. This preparation is obtained by completely drying the serum in vacuo at 45° C., and mixing it with sterilized sugar of milk; it represents a very fine yellowish and almost odorless powder.

This should be snuffed into the nostrils or blown in with an insufflator, and can be dusted upon the conjunctiva with a camel's hair brush.

According to the reports which have thus far been received, the pollantin in powder form is preferred by most patients on account of its manifest advantages. True, some patients have stated that repeated use of the powder in the eyes produces unpleasant irritation of the conjunctiva, and that consequently they prefer to use the fluid pollantin for the eyes, though they continue to give the powder the preference in the treatment of the nasal symptoms.

In fact, this plan is probably the most appropriate for cases in which the eyes require frequent treatment. On the other hand, the application of a small quantity of the powder once or twice daily will cause no plaint and afford sufficient protection.

In a large number of cases in which the treatment was limited almost exclusively to the nasal mucous membrane, there was relief to all the symptoms, even including those which pertained to the eyes.

The somewhat forcible snuffing of the powder into the nostrils caused a disagreeable irritation in some cases, but this was remedied when it was insufflated with a powder blower. (The one mentioned by Dr. Goldstein, of St. Louis, is a handy and suitable one.) The snuffing of the powder into the nostrils is not always effective in the treatment of the annoying irritation of the throat and palate, and for this symptom the use of the powder blower is recommended.

One patient was accustomed to apply the pollantin powder to her palate with her finger, thus quickly succeeding in relieving the irritation.

The method of using the pulverized serum includes the following particulars:

(1) A portion of the pulverized pollantin, as large as a lentil, is dropped into the little scoop attached to the stopper of the pollantin bottle. The scoop is then held under one of the nostrils, the other nostril being compressed and occluded by the finger. The powder is then snuffed into the open nostril, the snuffing being repeated

several times, and during the same the ala of the nostril is lightly tapped with the finger to distribute the powder over as much of the mucous membrane as possible.

(2) If the powder is also to be used for the eyes, the accompanying camel's hair brush is lightly dipped into it, the brush being then gently applied to the inner surface of the attached lower lid, or a small quantity of the powder may be shaken upon it from the brush. With each new bottle of the powder a new brush should also be brought into use.

The additional points for the application are covered by the directions given for treatment with the liquid pollantin.

Whether the serum is used in its fluid or powdered form, the method of using it should be strictly in conformity with the directions given.

In addition to the use of the serum, rational prophylactic measures should also be observed during the hay-fever season, for only in this way can good results be obtained.

The first measure of prophylaxis consists in properly protecting the body during the hours of sleep, when the reflexa which are excited by pollen (sneezing, coughing and lachrymation) are more or less quiescent, from the invasion of the pollen influence. The windows and doors of the sleeping-room must remain closed, as far as possible, during the hay-fever season; also the windows on the windward side of the house. The washed garments which have been bleached upon the lawn should be thoroughly beaten before they are used, and the clothing should be carefully brushed before the house is entered.

Self-understood, no flowering plants whose pollen may induce hay fever, must be suffered to remain in the house.

The pollen should be applied to the mucous membrane as early in the day as possible, preferably on awakening, even though there may be no immediate evidence of irritation. The application should be repeated several times during the day, and always in anticipation of the causes for the expectant severer attack.

Therefore, before walking in the open, riding or wheeling, and above all at appearance of the slightest irritating indications.

The latest application for the day should not be immediately before retiring, but an hour or two previous, for otherwise the serum may form a sticky crust upon the mucous membrane. As a rule,

from three to five applications per day will suffice to keep one free from discomfort.

Many patients have now and then observed that immediately following the use of the serum an increased irritation was manifested, and believed such at first as due to its use.

In these cases the nose had been previously irritated, and it became necessary to apply the serum not only once, but several times in quick succession before the irritation was removed.

RECENT LITERATURE RELATING TO PHARMACY.

SOME NEW ESSENTIAL OILS.

Messrs. Schimmel & Co., in their semi-annual report for April-May, 1905, pp. 82–86, give the results of their examinations of the following oils:

Oil from *Fagara octandra* L. (Rutaceæ). The oil obtained from the wood of the tree originates from Mexico, and has a bright-yellow color and a linalool-like odor; $d_{15°}$ 0·922; a_D + 2° 30′; ester number 6·09; soluble in 0·5 volumes 90 per cent. alcohol, when more than 1·5 volume alcohol is added, cloudiness occurs.

Oil from *Inula graveolens* L. Desf. This composite, which is distributed largely in the countries of the Mediterranean, yields on steam distillation a brown oil with a greenish fluorescence; $d_{15°}$ 0·9754; a_D — 36° 40′; acid number 8·45; ester number 161·3; ester number after acetylation 239·38; soluble in 3 to 3·5 and more volumes 70 per cent. alcohol, with large separation of paraffin. Judging from the odor the oil contains bornyl acetate.

From London we received a distillate originating from Australia of the Myrtacea *Backhousia citriodora* F. v. Müll., which is there indigenous. Years ago[1] we examined a similar oil and described it briefly; the present sample agrees well with the former one. The bright yellow oil has an aroma like lemongrass oil, but finer; its specific gravity is 0·8972 at 15°; a_D ± 0°; about 95 per cent. aldehyde, probably exclusively citral; soluble in 1·8 and more volumes 70 per cent. alcohol.

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[1] Report April, **1888**, 20; Comp. also Gildemeister and Hoffmann, "The Volatile Oils," p. 538.

A sample received from the South of France, of oil of the leaves of *Cupressus Lambertiana*, a tree which is often found in the gardens on the Riviera, differs essentially from ordinary cypress oil. The odor of the yellowish green oil has a melissa character which is probably due to the presence of citronellal. When extracted with sodium bisulphite, aldehydic constituents could actually be detected, but their quantity was too small to identify them; the odor pointed to citronellal or a fatty aldehyde. The non-aldehydic portions had a pepper-like odor, and may possibly contain cymene. The other properties of the oil were the following: $d_{15°}$ 0.8656; a_D + 31° 53′; acid number 1.5; ester number 13.9; ester number after acetylation 50.82; forms a cloudy solution with 9 to 10 volumes 80 per cent. alcohol, and a clear solution with 0.5 per cent. and more volumes 90 per cent. alcohol. The yield of oil was about 0.1 per cent.

From the same source originated an oil from the leaves of *Laurus Camphora*. The oil, obtained from the leaves of a tree growing in a garden at Cannes, is in so far specially interesting, that it has a pronounced cardamom-like odor, and, as was shown by the examination, is also closely allied in its composition to the cardamom oils. The oil has little resemblance to previously examined[2] distillates from the leaves of *Laurus camphora* L. It is an open question to what cause these differences must be attributed. The oil, obtained in a yield of about 0.52 per cent., was colorless and behaved as follows: $d_{15°}$ 0.9058; a_D — 26° 12′; acid number 0.34; ester number 8.82; ester number after acetylation 46.9; soluble in 1 and more volumes 80 per cent. alcohol. The oil boils at 4 mm. between 35° and 95°. In the lowest boiling portions we detected pinene (melting point of the nitrolbenzylamine 123°); the presence of camphene is probable, but it could not be proved with certainty (by conversion into isoborneol). The oil further contains large quantities of cineol (melting point of the iodol-compound 112°).

From the oil-portions passing over above 76° at 4 mm., there was obtained by fractionating *in vacuo* repeated several times, a principal fraction (a_D — 58° 23′) boiling between 85° and 86° (5 mm.), which represented about 10 per cent. of the oil employed, and, as the further examination showed, consisted of l-terpineol, which was more closely identified by its phenyl urethane (melting point 112°).

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[2] Comp. Gildemeister and Hoffmann, "The Volatile Oils," p. 371.

By inoculating the fraction (of which the temperature had been much reduced) with solid terpineol, and letting it stand in the cold for a prolonged time, terpineol of the melting point 35° was obtained.

Oil from *Amomum mala.* An oil very similar to the one just described was received by us from the Biologico-agricultural Institute of Amani (German East Africa). The brownish-yellow oil obtained in a yield of about 0·76 per cent., is a distillate from the pulverized fruit (seed and peel) of *Amomum mala,* a Zingiberacea very widely distributed in the forests of German East Africa. This oil is also closely allied in its properties and composition to the cardamom oils which (contrary to the preceding oil) is explained by its botanical origin. A preliminary examination showed that this oil also contains much cineol (melting point of the iodol-compound 112°), and also terpineol. The oil distilled over at 7 mm. between 51° and 100°; $d_{15°}$ 0·9016; a_D — 10° 54′; acid number 3·5; ester number 1·7; ester number after acetylation 67·05; makes a cloudy solution with 1 to 1·5 and more volumes 80 per cent. alcohol.

Oil from an African species of Labiatæ. An oil also originating from German East Africa, from a species of Labiatæ growing there wild concerning which we have not yet had any further information. The red-brown oil had an odor like thymoquinone; $d_{15°}$ 0 9594; saponification number 42·67; ester number after acetylation 164·6; soluble in 1·5 and more volume 80 per cent. alcohol; from the dilute solution flakes (paraffin ?) separate off after some time.

The cultivation of andropogon grasses has also been tried at Amani. We recived from there the following two oils:

Vetiver oil. The oil distilled from fresh roots has a bright yellow color; $d_{15°}$ 1·0023; a_D + 33° 42′, acid number 16·06; ester number 12·16; ester number after acetylation 142·35; soluble in 1 and more volume 80 per cent. alcohol.

The oil corresponds to the distillates produced in Réunion, and is a normal product serviceable for the purposes of the perfumery trade. The differences between this oil and the oils distilled in Germany may be explained by the different character of the distillation material.

Less favorable are the results of the experiments made with the cultivation of *Andropogon citratus* D. C., at least the sample of

Lemongrass oil obtained from fresh plants, which has been sent to us, cannot be considered à competing product, as the following

constants will show: $d_{15°}$ 0·9123; a_D — 0° 15′; aldehyde-content about 60 per cent. The oil dissolves in 0 8 volume 80 per cent. alcohol, but when further diluted heavy cloudiness occurs; the behavior towards 90 per cent. alcohol is the same. The last-named property also belongs to the West Indian distillates, and the those obtained in the Cameroons.[1]

We would finally mention the oil from Hardwickia binata Roxb. (*Oil of ennaikulavo*) which has been sent to us from London. The tree which is found in British India belongs to the Leguminosæ. The balsam has a red-brown color, green when in a very thin film, and shows a green fluorescence. The odor is peculiar, and not exactly pleasant; $d_{15°}$ 1·0021; acid number 96·15; ester number 12·31; insoluble in 10 volumes 80 per cent. alcohol. On steam-distillation about 44 per cent. of a colorless fairly mobile oil passed over, whilst a brittle green resin remained behind. The distillate had the following constants:

$d_{15°}$ 0·9062; a_D — 7° 42′; acid number 0·85; ester number 2·88; soluble in about 5 and more volumes 95 per cent. alcohol.

Of oils distilled by ourselves we mention the following novelties:

Oil from bay berries from the Bermuda Islands. The yellow brown oil has an aromatic odor which, however, clearly differs from that of the ordinary bay oil. The yield of oil amounted to 3 66 per cent; $d_{15°}$ 1·0170; a_D — 7° 3′; phenol-content 73 per cent.; soluble in 1·5 volumes 70 per cent. alcohol, cloudiness when more than about 4 volumes were added; soluble in 0·5 and more volumes 80 per cent. alcohol.

The phenols consist of eugenol (melting point of the benzoyl-compound about 70°). The non-phenols contain abundant quantities of l-phellandrene (melting point of the nitrite recrystallized from acetic ether 103° to 104°); myrcene, however, does not appear to be present in the oil.

Oil of *Artemisia annua* L. (Compositæ). The oil obtained in a yield of 0·29 per cent. from the green herb cultivated by ourselves, has a lemon-yellow color and a pleasant, refreshing odor, reminding distantly of sweet basil. The specific gravity was 0 8912 at 15°,

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[1] Comp. Reports October, **1902**, 50; April, **1903**, 49; October, **1903**, 46; October, **1904**, 53.

the optical rotation a_D — 1° 18′; acid number 3·8; ester number 19·2; ester number after acetylation 44·5; the oil dissolved in 1 to 1·5 volumes 80 per cent. alcohol, but when more alcohol was added opalescence or cloudiness occurred owing to a large separation of paraffin.

CORRESPONDENCE.

THE UNITED STATES PHARMACOPŒIA.

The fifth annual meeting of the Board of Trustees of the United States Pharmacopœia Convention was held at the Philadelphia College of Pharmacy, May 13th. The members present were: Dr. J. H. Beal, Scio, O.; Mr. Albert E. Ebert, Chicago; Prof. Joseph P. Remington, Philadelphia; Mr. S. A. D. Sheppard, Boston; Dr. H. M. Whelpley, St. Louis; Dr. H. C. Wood, Philadelphia. In the absence of Chairman Charles E. Dohme, who is in Europe, Vice-Chairman Beal called the meeting to order.

The minutes of the fourth annual meeting and the intervening correspondence of the board were read and approved.

It was decided that a sample page or pages of new books in which it is desired to use some of the text of the Pharmacopœia shall be submitted to the chairman or acting chairman for approval before permission to use pharmacopœial text be given.

Professor Remington, chairman of the Committee on Revision, made a detailed report of the progress of the work, and stated that the new Pharmacopœia would be out before the end of June. The action of the chairman in fixing August 1, 1905, as the date from which the new revision will be official, was approved. One hundred unbound copies will be distributed simultaneously to pharmaceutical and medical journals for review purposes.

All books paying for the use of pharmacopœial text will be required to print upon the obverse of the title page the following words in full-face or black-letter type: "Authority to use for comment the Pharmacopœia of the United States of America, Eighth Decennial Revision, in this volume, has been granted by the Board of Trustees of the United States Pharmacopœial Convention, which Board of Trustees is in no way responsible for the accuracy of any

translations of the official weights and measures or for any statements as to strength of official preparations."

The subject of a Spanish edition of the Pharmacopœia was reported upon by President Wood. He was instructed to continue his investigations and again report to the board. Dr. Wood finds considerable demand for a Spanish edition of the United States Pharmacopœia in Cuba, Mexico, Costa Rica and Porto Rico.

The Rice Memorial Fund Committee made a final report. Mr. S. A. D. Sheppard was appointed a special committee of one to take charge of this fund and deposit the same in the name of the Board of Trustees of the U. S. P. Convention.

It was decided that as soon as sufficient moneys shall have been received after paying present indebtedness and current bills that the sum of $200 be paid to each member of the Committee on Revision, excepting the chairman (Prof. J. P. Remington), to whom shall be paid $2,000; to the secretary of trustees (Dr. Murray G. Motter) $500, and the treasurer of the convention (Dr. George W. Cook) $200. The secretary of the board reported progress on the Abstract of Proceedings of the Board of Trustees, and further action was postponed.

The following officers and standing committees were elected for the ensuing year: Chairman, Charles E. Dohme, Baltimore, Md.; Secretary, Dr. Murray G. Motter, Washington, D. C.; Executive Committee, Dr. J. H. Beal, Scio, O. (chairman); Dr. H. C. Wood and Charles E. Dohme; Auditing Committee, Dr. H. M. Whelpley, St. Louis, Mo. (chairman); Dr. A. E. Ebert, Chicago, and S. A. D. Sheppard, Boston, Mass.

H. M. WHELPLEY,
Secretary, U. S. P. Convention.

ST. LOUIS, MO., May 30, 05.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A COURSE IN QUALITATIVE INORGANIC CHEMISTRY. By Arthur L. Green and Chas. E. Vanderkleed.

This little book of 158 pages seems to be very acceptable. It is particularly strong in introducing and leading up to the subject of qualitative analysis, so that the student does not learn the mechanical work of analysis without thoroughly understanding the fundamental principles and reactions.

There seems to be a special feature of nomenclature and definitions. Stress is also put on the writing of equations, for which the rules seem to be particularly clear and comprehensive.

The brief mention of the ionization in solutions is an excellent example of the way in which the book is brought up to date.

The scheme is simple and only modified from well tried forms in ways that inspire every confidence, rather than otherwise.

The whole treatment is very systematic and thorough without being too lengthy, and the mechanical work makes it very easy for reference.

To show the arrangement of the book, the sections treated therein are as follows: Definitions, nomenclature and notation; equations; reagents; rules leading to the analysis of metals; the detection of metals (including scheme of analysis); table of precipitation; rules leading to the analysis of acids; the detection of acids (including scheme); special tests for acids, and directions for teachers.

S. S. SADTLER.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AT THE FIFTY-SECOND ANNUAL MEETING. Held at Kansas City, Mo., September, 1904. Also the Roll of the Members. Baltimore: Published by the American Pharmaceutical Association, 1904.

Volume LII of the proceedings of the American Pharmaceutical Association comes to us with a number of radical, but more or less desirable, changes. The most evident of these changes is to be found in the report of the discussions on papers and motions; these discussions are for the first time in many years reported in abstract, in place of reproducing them verbatim, as on previous occasions. This single innovation has resulted in the saving of at least 100 pages of printed matter and, in addition, gives the book a much more presentable appearance. In addition to this, much of the stereotyped material that has been published annually for many years has been omitted, and the duplicate list of members has been condensed into a single list.

More than one-half of this volume of more than 1,000 pages, or a total of 531 pages, is devoted to the report on the progress of pharmacy. This report, as on former occasions, constitutes practically a year-book or review of all the literature relating to pharmacy, and is by far the most important feature of the book. Altogether it

may be said that this book constitutes one of the most valuable, most interesting and most readable volumes of the proceedings of the American Pharmaceutical Association so far published. The index, comprising some sixteen double-column pages, is still incomplete, and might readily be improved on; this is, however, a minor defect, and will undoubtedly be remedied in future volumes of the proceedings. M. I. WILBERT.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The following is the provisional programme for the Atlantic City meeting of the American Pharmaceutical Association:

Monday, September 4th, 10 A.M.—Meeting of the Council; 3 P.M. —First General Session; 8.30 P.M.—Reception.

Tuesday, September 5th, 10 A.M.—Second General Session; 3 P.M. —Section on Commercial Interests; 8 P.M.—Section on Education and Legislation.

Wednesday, September 6th, 10 A.M.—Section on Education and Legislation; 3 P.M.—Section on Historical Pharmacy; 8 P.M.—Section on Scientific Papers.

Thursday, September 7th, 10 A.M.—Section on Scientific Papers; 3 P.M.—Meeting of Conference of Teaching Faculties, meeting of Association of Boards of Pharmacy; 8 P.M.—Lecture on Radium by Prof. Charles Baskerville.

Friday, September 8th, 10 A.M.—Section on Practical Pharmacy and Dispensing; 3 P.M.—Section on Practical Pharmacy and Dispensing; 8 P.M.—Installation of new officers.

Saturday, September 9th, 10 A.M.—Last General Session.

COMMITTEE ON SCIENTIFIC PAPERS.

To the Members of the A. Ph. A.:

The Committee on Scientific Papers invite contributions of scientific interest for presentation at the forthcoming meeting at Atlantic City.

The committee will endeavor to arrange the programme so that every paper submitted will receive consideration. Contributors will aid the committee if they will send their papers to the chairman as early as possible.

The attention of members is called to the change in Article IV, Chapter 14, of the By-Laws, adopted at the Kansas City meeting

last year, which provides that "Any person desiring to submit a paper to the Association shall present to the chairman of the particular section to which it refers at least ten days prior to the meeting an abstract of said paper, indicative of its contents, and consisting of not less than fifty nor more than 200 words. This abstract shall be printed as a part of the programme. The paper itself must be submitted to the officers of the section previous to the first session."

The committee take pleasure in announcing that Dr. Charles Baskerville, Professor of Chemistry in the College of the City of New York, has consented to deliver a popular lecture on "Radium and Radio-activity," on the evening of Friday, September 8th. The lecture will be experimentally illustrated.

Contributors are requested to send their papers to the chairman by July 20th. Eustace H. Gane, chairman, 91 Fulton Street, New York; Daniel Base, associate; Charles E. Caspari, Secretary.

June, 1903.

THE HISTORY OF THE PHARMACY OF THE CIVIL WAR.

The Committee on Historical Pharmacy of the American Pharmaceutical Association has undertaken to collate data bearing on the military and naval pharmacy of the Civil War, and has issued an appeal for aid from all who have any knowledge of the subject. The men who participated in that struggle are fast passing away, and it is to be hoped that the committee will be successful in its effort. The committee requests all who are in a position to furnish information on the subject, or who can suggest possible sources of information, to communicate with any of the officers of the section as follows: Albert E. Ebert, chairman, 426 State Street, Chicago, Ill; Prof. Edward Kremers, historian, University of Wisconsin, Madison, Wis.; Caswell A. Mayo, secretary, 66 West Broadway, New York

DELAWARE PHARMACEUTICAL SOCIETY.

The nineteenth annual meeting of the Delaware Pharmaceutical Society was held in Wilmington on Thursday, June 8, 1905. The business session opened at 11 A.M. and lasted three hours. John F. Hancock, of Baltimore, made an address eulogizing the late Prof. William Procter, Jr., recounting what had been done in the way of

establishing a suitable memorial, and closing his address by making a strong plea for subscriptions towards defraying the expenses of such memorial. He was followed by N. B. Danforth, who referred to his acquaintance with Professor Procter and rejoiced in the knowledge that Procter's name is on his diploma. On motion a Committee on Procter Memorial Fund was appointed.

The Philadelphia representative of the N. A. R. D., gave a report of what the Association has accomplished, and pointed out how the work of the Association may be made of more value to the retailer by the retailer giving information of all violations of the contract plan which come to his knowledge.

Resolutions were adopted endorsing the work of the N.A.R.D., re-endorsing the text of the Mann Bill, and urging the reduction of the internal revenue tax on alcohol.

At 2 P.M the meeting adjourned to the Hotel Wilmington for dinner, after which, by means of carriages, the members were conveyed through the historic Brandywine Park, giving a fitting ending to a very pleasant occasion. F. P. STROUP.

MISSOURI PHARMACEUTICAL ASSOCIATION.

The Missouri Pharmaceutical Association held its twenty-seventh annual meeting at Pertle Springs, Warrensburg, June 13–16, 1905. It was the eighth meeting at this summer resort.

Thirty-five new members were elected and thirteen dropped for non-payment of dues, leaving a total of 314 on the roll. The following papers, talks and demonstrations were presented:

(1) The Second Missouri Pharmaceutical Association Meeting, by H. M. Whelpley.

(2) The Malay Medicine Man, by J. F. Llewellyn.

(3) Prescription and Dispensing Chips, by Francis Hemm.

(4) The First Weekly Drug Journal in Missouri, by H. M. Whelpley.

(5) Some Laws of Direct Interest to Us, by Francis Hemm.

(6) Official Chemicals—Digest of Examinations, by Charles E. Caspari.

(7) The First Drug Periodical in Missouri, by H. M. Whelpley.

(8) Addenda to Second Missouri Pharmaceutical Association Meeting, by H. M. Pettit.

(9) Timely Topics, by H. M. Whelpley.

(10) Microscopy and the New Pharmacopœia, by H. M. Whelpley.

(11) Anilin Colors, by William Mittelbach.

(12) Leisure Moments Turned into Days of Profit, by Charles L. Wright.

(13) Report on Adulteration of Drugs, by Ambrose Mueller.

(14) Proposed Changes in the Missouri Pharmacy Law, by Charles L. Wright.

(15) The Druggist, by F. R. Dimmitt.

(16) Pharmacy in 1880 and Now, by Paul Schweitzer.

The Board of Pharmacy reported that 86 had registered on diploma, 42 by examination and 144 failed during the year. A meeting of the Board was held at Pertle Springs June 12th, and 14 of the 35 examined were registered. Charles Gietner, of St. Louis, and G. W. Carmack, of Plattsburg, were endorsed as candidates for a vacancy on the Board which occurs July 1st.

Charles L. Wright is chairman of a committee to adapt the Beal Model Pharmacy Law to Missouri conditions and report at the 1906 meeting.

The N.A.R.D. was voted $50.

The Council was empowered to elect new members between the dates of annual meetings. The following officers were elected: President, J. F. Llewellyn, Mexico; Vice-Presidents, Charles D. Morrow, St. Louis; W. R. Ashbrook, Jamesport, and Louis Grother, Cole Camp; Treasurer, William Mittelbach, Boonville; Permanent Secretary, H. M. Whelpley, St. Louis; Assistant Secretary, R. C. Wesner; Local Secretary, J. V. Murray, Warrensburg; Council: Ed. G. Orear, chairman, Maryville; Paul L. Hess, vice-chairman, Kansas City; Dr. Otto F. Claus, secretary, St. Louis; William H. Lamont, St. Louis, W. E. Bard, Sedalia.

Delegates: A. Ph. A., Dr. Otto F. Claus, St. Louis; N. A. R. D., Charles L. Wright, Webb City, Ill.; Ph. A., Dr. H. M. Whelpley, St. Louis.

President Llewellyn announced the following chairmen of committees: Deceased Members, John P. Dow, Sedalia; Drug Adulteration, Dr. Charles E. Caspari, St. Louis; Exhibits, Fred Pierce, Nevada; Entertainment, Lorenz A. Seitz, St. Louis; Ladies' Auxiliary Entertainment, Mrs. H. M. Whelpley, St. Louis; Legislation, Charles L. Wright, Webb City; National Formulary, Mrs. D. V.

Whitney, Kansas City; Membership and Attendance, William H. Lamont, St. Louis; Papers and Queries, Prof. Francis Hemm, St. Louis; Trade Interest, H. D. Faxon, Kansas City; Transportation, Aug. T. Fleishmann, Kansas City; United States Pharmacopœia, William Mittelbach, Boonville.

A special committee on Fire Insurance was appointed in response to a communication from the Ohio Valley Pharmaceutical Association.

The meeting was one of the most enthusiastic and enjoyable in the history of the Association. The 1906 meeting will be held at Pertle Springs, June 12th–15th.

H. M. WHELPLEY.

PHARMACEUTICAL MEETING.

The closing Pharmaceutical Meeting of the series for 1904–05 of the Philadelphia College of Pharmacy was held Tuesday afternoon, May 16th, with E. M. Boring, a member of the Board of Trustees, in the chair.

Thomas S. Wiegand, Ph.M., who has been librarian of the College for some years past, read a paper entitled "Practical Notes on Pharmaceutical Subjects" (see page 326), and exhibited in connection therewith some apparatus. He said:

"It may be well to exhibit a few vessels that render the methods just noted for percentage solutions of easy execution. For the solution of corrosive sublimate, which is frequently used in sterilizing articles used in surgical cases, a bottle is to be selected which holds exactly 7,000 grains (1 pound avoirdupois), 7 grains of the salt are mixed with a small quantity of distilled water, the solution poured into the bottle and then filled with distilled water; this bottle should be kept ready for use at all times. For strychnine sulphate to be used in dispensing, a 2-ounce glass stoppered vial that contains exactly 2 fluid ounces when the stopper is in its place is desirable. This vial should be properly labeled and the formula strychnia sulphate, grs. iv, distilled water $f\bar{3}j$, should be marked on it. All these active remedies should be kept in a special part of the dispensing counter used only for such active remedies."

M. I. Wilbert, remarking on the use of preservatives for solutions of salts of cocaine, said they were not permissible, particularly boric

acid. He said that it was not the spoiling of the solution, that is, the formation of microscopic organisms, which was to be guarded against so much as the hydrolysis of the salts, these being very unstable. He also said that it was very difficult to produce the solutions of gelatin used in surgery, as they cannot be sterilized, and referred to several fatal cases of poisoning which had occurred lately, particularly in Germany. He said that some manufacturers put up sterile solutions of gelatin which are intended to be diluted with sterile water.

With regard to percentage solutions, Mr. Wilbert said that the work was much simplified by making the calculations in the metric system and by the use of metric weights and measures.

Mr. Wiegand agreed with this, and said that he did not believe in converting one system into another, particularly when in a hurry. He thought it was much better to use either one system or the other.

Mr. Boring said that there was an advantage in using alcohol in making strychnine solutions, as it not only helped to dissolve the salt, but also was an advantage in dispensing.

M. I. Wilbert, Ph.M., read a paper on "A Quarterly Review of Progress in Pharmacy," which was published in the June issue of this JOURNAL (Vol. lxxvii, p. 281).

In discussing the paper Joseph L. Lemberger, Ph.M., of Lebanon, Pa., referred to the recent amendment of the Pennsylvania pharmacy law, and said that it was much easier to amend a law than it was to enact it in the first place. He thought that a great advance had been made, particularly when it is remembered that the people in the country have not the advantages in an educational way enjoyed by the residents of cities.

Mr. Wilbert said that the educational system in Pennsylvania is at fault. He said we should try to get back of the schools, and that there would be an advantage in having a universal body to look after the educational work in the State, as is the case in New York, and that the teaching body should not conduct the examinations.

Wm. McIntyre, who is a member of the Board of Education in Philadelphia, agreed that there would be an advantage in having a central educational body, which would advance the people's school on the one hand and at the same time consider the interests of the universities. He said it was often a question as to how far the pub-

lic schools should be advanced, and that there often seemed to be a gap between these and the universities.

Prof. Henry Kraemer gave a short talk on "An Experiment in the Growing of Medicinal and Other Plants," which was illustrated with a number of lantern slides. The observations made will be embodied in a paper and published later.

FLORENCE YAPLE,
Secretary pro tem.

NOTES AND NEWS.

MEMORIAL SERVICES FOR THE LATE E. H. SARGENT were held in Booth Hall, Northwestern University Building, Chicago, on the afternoon of June 8th. The services were largely attended by family friends, Chicago druggists and the faculty and students in the School of Pharmacy. As part of the program, President T. F. Holgate told of Mr. Sargent's connection with the School since its inception, and of his continued aid as a member of its Executive Committee until the time of his death The Rev. Louis P. Mercer, of Cincinnati, O., for many years pastor of the deceased, related incidents drawn from personal experiences illustrative of his character as a man. Mr. Henry Biroth, President of the Chicago Veteran Druggists' Association, spoke on behalf of many business friends and associates, and Mr. Albert E. Ebert gave a short account of Mr. Sargent's services to the American Pharmaceutical Association.

UNIVERSITY OF MICHIGAN.—Owing to the death of Dr. A. B. Prescott, of the University of Michigan, last February, the office of Dean of the School of Pharmacy was made vacant. At the last meeting of the Board of Regents, held on May 13th, Prof. J. O. Schlotterbeck, Junior Professor of Pharmacognosy and Botany, was elected to fill the vacancy.

Prof. A. B. Stevens, Professor of Pharmacy, who has been studying at Berne, Switzerland, for the past two years, returns early in September, and will take up his duties in the School of Pharmacy.

THE LEWIS AND CLARK PHARMACEUTICAL CONGRESS.—Plans are now being matured to hold a Pharmaceutical Congress at the Lewis and Clark Exposition, Portland, Ore. It is proposed to convene the Congress July 11–14, holding eight to ten sessions. The Washington, Oregon and California State Associations of Pharmacy will also hold joint sessions at that time. The headquarters will be at the "American Inn" which is in the Exposition grounds.

Papers are to be presented pertaining to the history of Pharmacy and to the status of Pharmacy on the Pacific Coast. A series of from fifty to sixty of these papers will be devoted to a concise and carefully prepared and condensed report on pharmaceutical progress up to date, including, in so far as possible, citations of the more important literature on the various subjects. It is intended to appoint well-known authorities on the various branches of the art and science of pharmacy, who shall serve as chief contributors, requesting them to prepare the summaries as suggested above, giving them full power and authority to appoint assistant contributors to aid them in their work.